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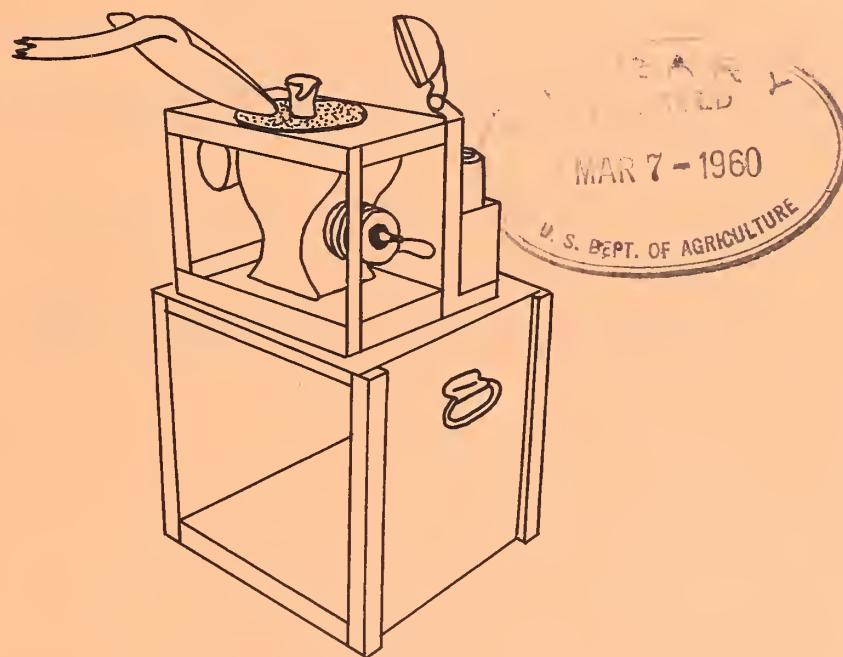
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TECHNICAL EQUIPMENT REPORT NO. F-8
JULY 1959

TOOL SHARPENER FOR FIRE CAMPS

by

MISSOULA EQUIPMENT DEVELOPMENT CENTER
FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
MISSOULA, MONTANA



FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

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FOREST SERVICE
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5640(5100)
October 5, 1959

ADDENDUM TO TECHNICAL EQUIPMENT REPORT NO. F-8
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TOOL SHARPENER FOR FIRE CAMPS

On page 2 the last sentence should read:

The nut turns clockwise for removal.

The following changes should be made in order to keep a smooth surface for animal packing on the front (heavy) side of the shipping box:

1. Put a 90° bend in the slotted leaf of the hasp,
3/4 inch from the pivot.
2. Mount the hasp on the outside of the cover and
locate the eye on the side of the box.

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TOOL SHARPENER FOR FIRE CAMPS

Missoula Equipment Development Center
U. S. Department of Agriculture
Forest Service
Missoula, Montana

July 1959

Introduction

An employee suggestion (#1495) by H. T. Wicklund and George Taylor of Region 1 has resulted in the development of an improved powered tool sharpener for fire camps.

This sharpener uses a lightweight low-cost four-cycle air-cooled gasoline engine with a built-in generator to provide light for night work. A grinding disc is mounted horizontally on a vertical shaft. See Fig. 1.

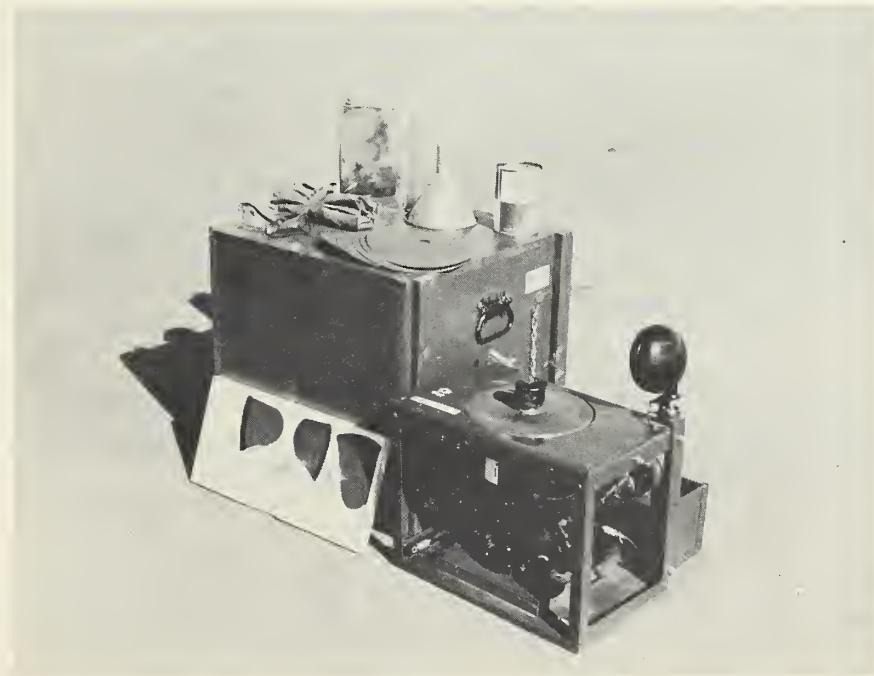


Figure 1. Complete outfit.

Requirements

A tool sharpener, to meet the requirements of fire camps, must be:

1. Small, compact, lightweight and rugged enough for delivery by parachute, helicopter, truck, mule or man-pack.
2. Reliable and easy to start and operate, and have a throttle control to regulate the grinding speed.
3. Capable of handling the tool-sharpening requirements of a 200-man fire camp.

Action

The Missoula Equipment Development Center designed and built a pilot model of the suggested tool grinder and submitted it to the Lolo Ranger District for a 3-month field test. According to Ranger Cox, this grinder would meet the needs of fire camps and is especially valuable for stations where electric power is not available. The grinder was dependable and easy to start and was "heavily used in preference to regular station grinders."

Experienced tool men in the Region 1 fire warehouse who tested the grinder were of the opinion that it will fulfill the needs of a 200-man fire camp.

The unit was air-dropped on a 24-foot cargo chute in a 25-m.p.h. wind which caused the box to tumble several times after landing. The machine was undamaged and started easily during the post inspection.

A time study with average dull tools showed the new model to be superior to other fire-camp grinders used in Region 1. Tools can be sharpened faster since they can be held at any angle (see Figs. 2, 3 and 4). Tools need not be clamped in place for grinding as is the case with other portable grinders. Wing nuts and bolts are used to secure the grinder to the box which serves as a work bench.

Cost

Prices will vary with volume; however, a conservative estimate of cost of commercially produced units is approximately \$200.

Considerations

The grinder discs are commercially available in a variety of grit sizes but tests showed that 100A grit paper is best for this machine.

In replacing discs it must be remembered that the starter-nut assembly is left-hand thread. The nut turns counter-clockwise for removal.

Reserve
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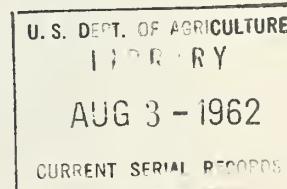
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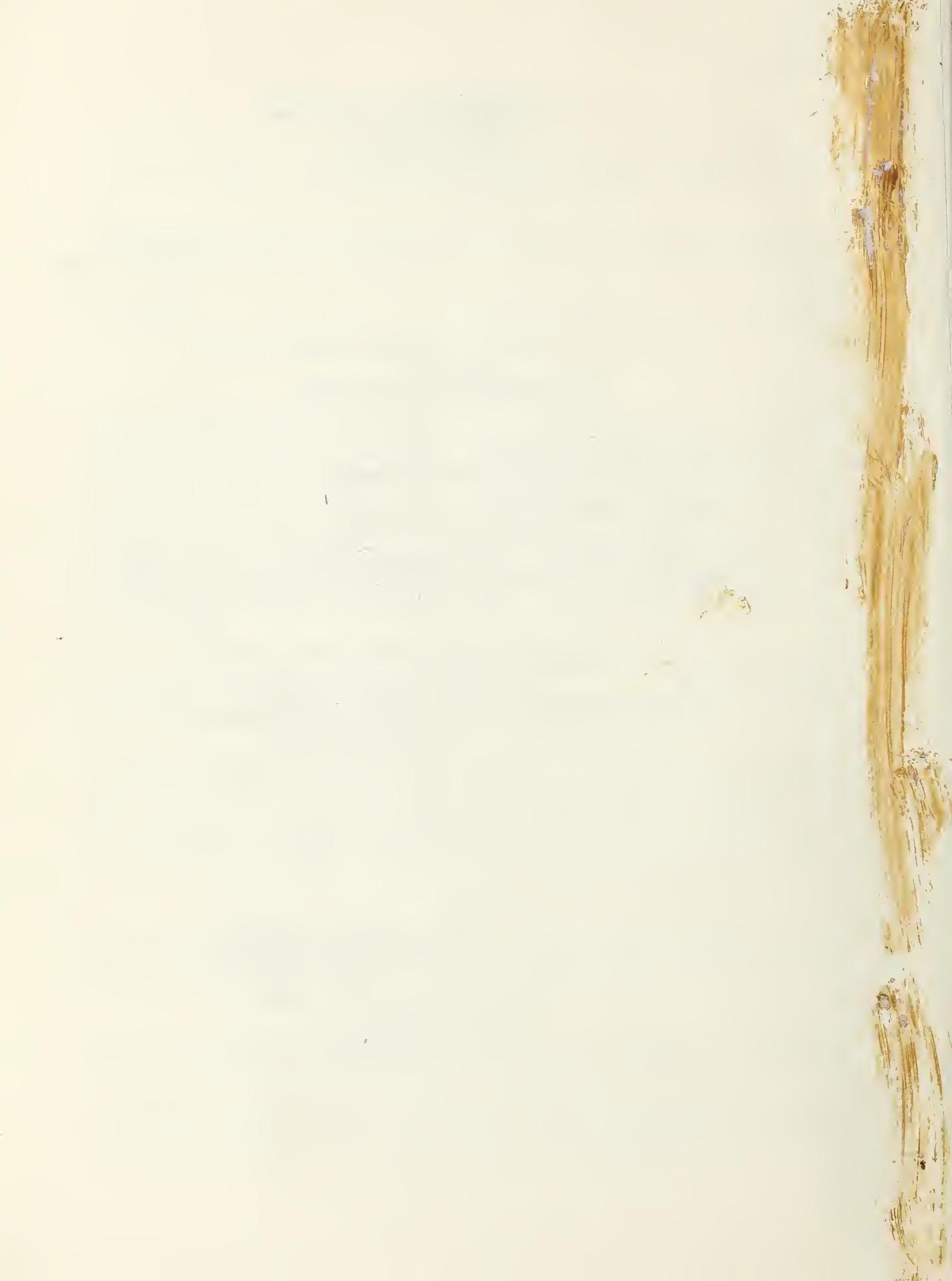
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A tool gauge board is included to aid in determining the grinding and reconditioning limits for badly worn or heavily nicked blades.

The grinder alone weighs 70 pounds. The complete unit, box and accessories, packaged for air-drop, weighs 125 pounds. This is approximately one-fourth the weight of other portable, powered tool grinders now stocked in Region 1's fire warehouse.

Conclusions

Field tests have shown this grinder to be reliable and economical. It fulfills a long-standing need for a grinder to be used in back-country stations or delivered to fire camps by air-drop, helicopter, mule-pack or man-pack.

Drawings and list of materials follow.

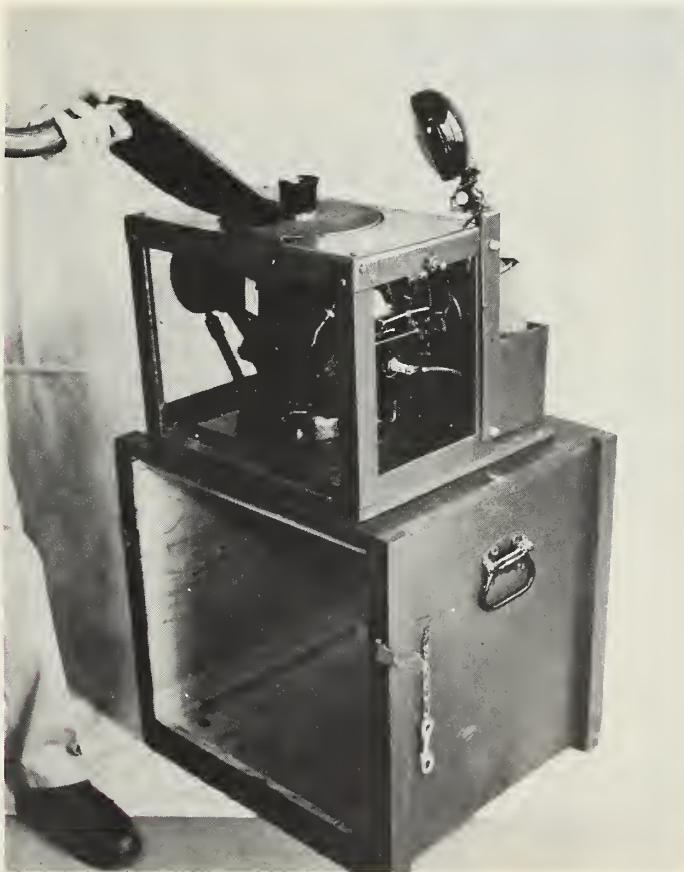


Figure 2. Sharpening shovel.

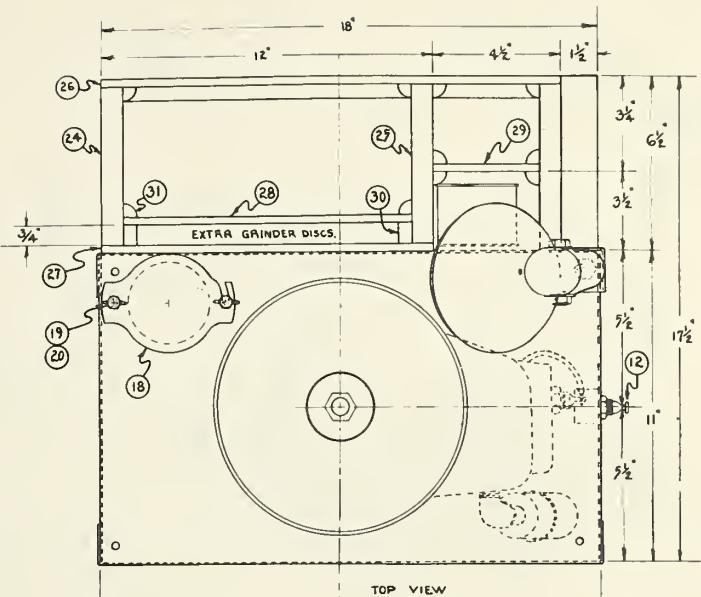


Sharpening a
pulaski tool.

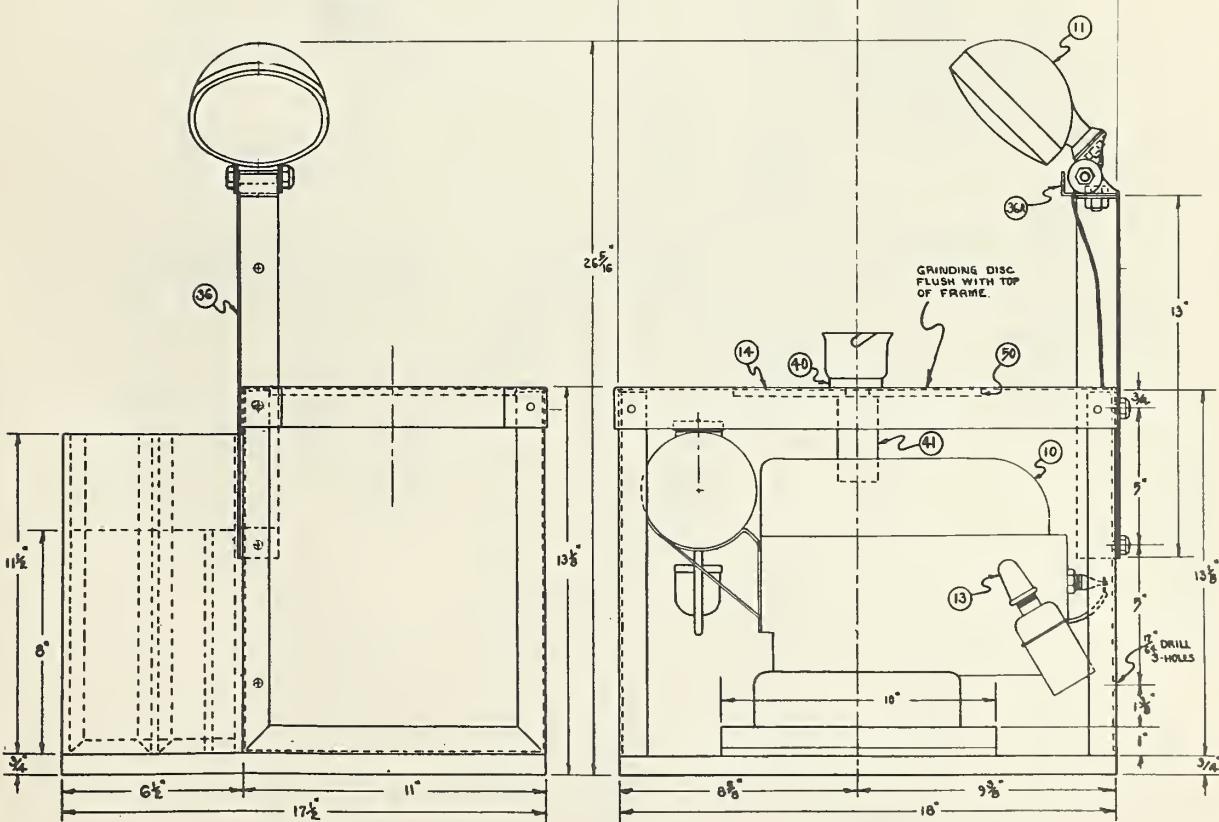
Figure 3.



Figure 4.



TOP VIEW



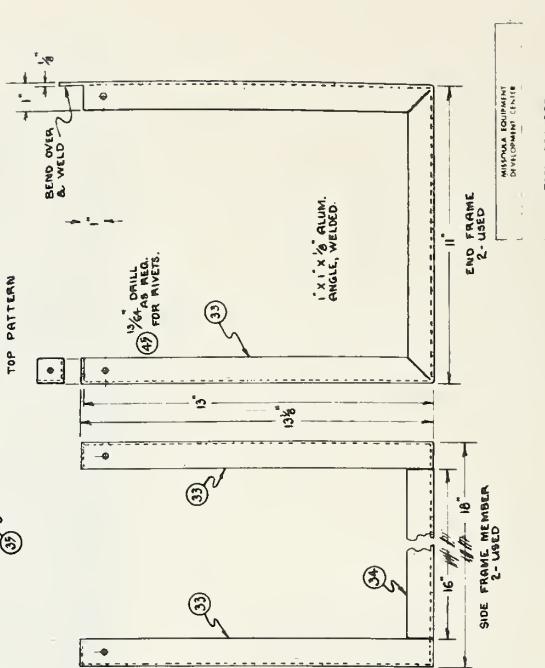
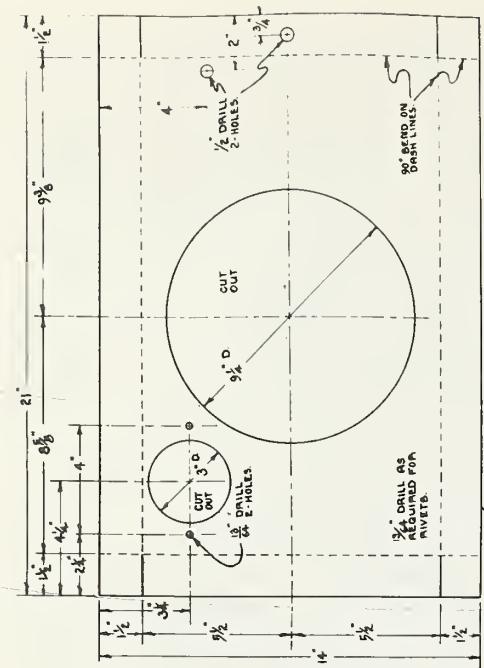
END VIEW

FRONT VIEW

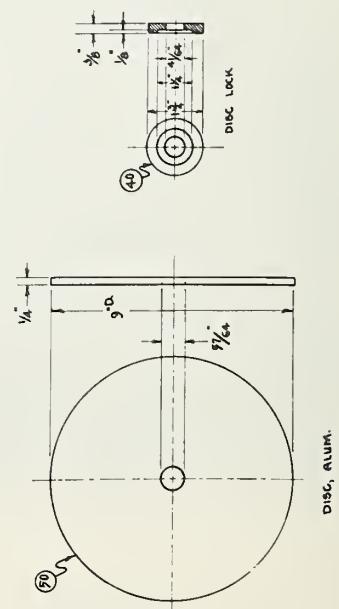
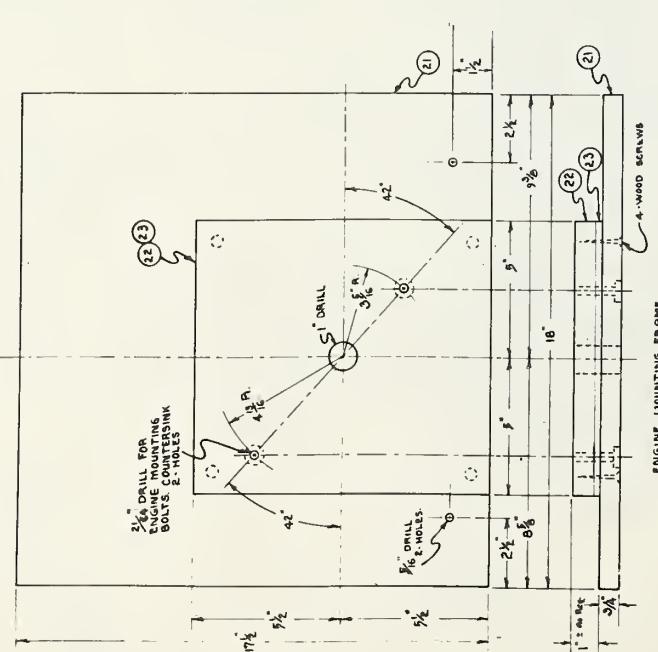
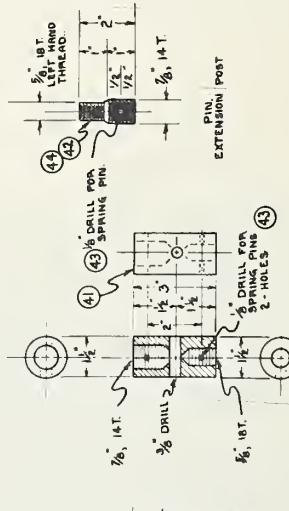
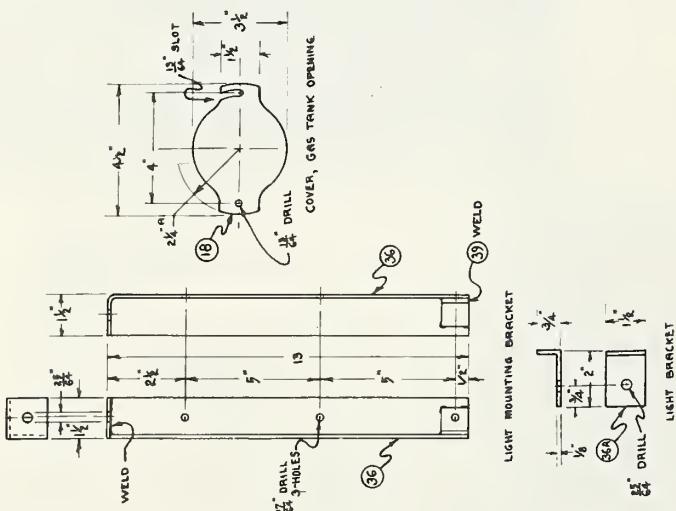
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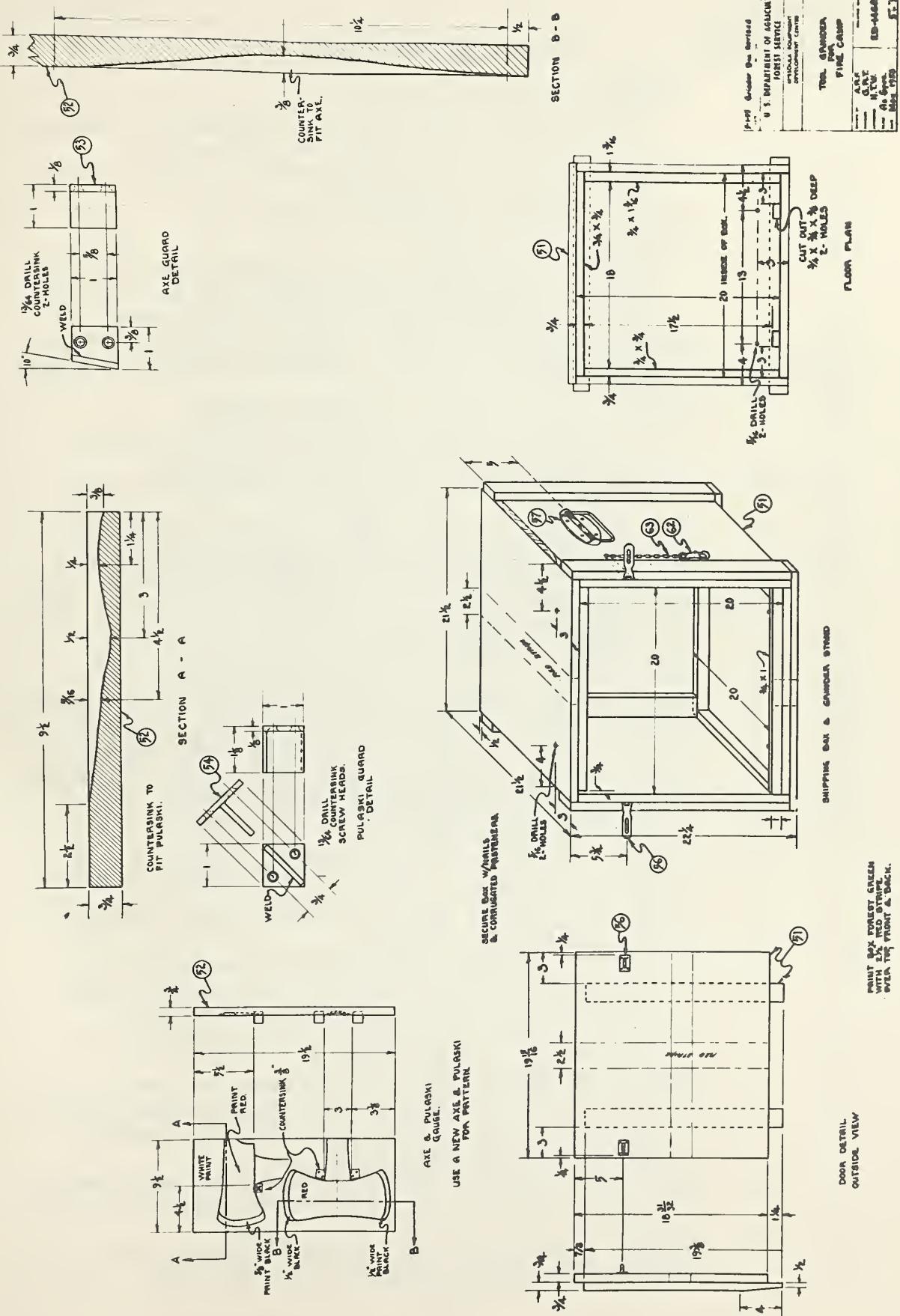
- REMOVE OIL DRAIN PLUG FROM ENGINE.
REPLACE WITH:

 1. **46** - $\frac{1}{2}$ " NIPPLE
 2. **47** - ELBOW
 3. **48** - $\frac{1}{2}$ " NIPPLE
 4. **49** - COUPLING
 5. **50** - ORIGINAL PLUG



ED-146A-R1





MATERIALS LIST

Part Number No.	Required	Material and Description
10	1	Continental engine, model AW7, 2 h.p., complete with hand throttle, choke control, lighting-coil assembly, special quiet-tone muffler and starter rope.
11	1	Lamp, K.D. No. 863-12, complete with 12 inches of wire and mounting post assembly.
12	1	Switch, complete assembly, push-pull type.
13	1	Street ell, 1/2-inch.
14	6	Grinding discs, aluminum oxide mineral, heavy all-fiber backing, closed-coat, resin-bonded, 3M Type C, 100-grit, 9-1/8-inch diameter with 7/8-inch hole.
15	2	Bolts, 5/16-inch by 2/inch, 24-thread, engine-mounting.
16	2	Nuts, hexagonal, 5/16-inch, 24-thread, fiberlock, engine-mounting.
17	4	Washers, 5/16-inch steel, engine-mounting.
18	1	Cover, access opening to fuel tank, 3-1/2 inches by 4-1/2 inches by .062-inch aluminum sheet.
19	2	Bolt for cover, 3/16-inch diameter by 1/2-inch long, 28-thread.
20	2	Wing fiberlock nuts for cover, 3/16-inch, 28-thread.
21	1	3/4-inch marine plyboard, 17-1/2 inches by 18 inches.
22	1	3/4-inch marine plyboard, 10 inches by 11 inches.
23	as req.	1/4-inch marine plyboard, 10 inches by 11 inches. (Shim as required.)
24	2	Pine board, 6 inches by 11-1/2 inches by 3/4 inch.
25	1	Pine board, 6 inches by 8 inches by 3/4 inch.
26	1	1/4-inch marine plyboard, 11-1/2 inches by 16-1/2 inches.
27	1	1/4-inch marine plyboard, 11-1/2 inches by 12 inches.
28	1	1/4-inch marine plyboard, 8 inches by 10-1/2 inches.
29	1	1/4-inch marine plyboard, 5-1/4 inches by 11-1/2 inches.
30	2	Pine board, 1/2 inch by 3/4 inch by 8 inches.
31	1	1/2-inch quarter round, 10 feet long, pine.
32	as req.	Screws, glue and nails.
33	2	1-inch by 1-inch by 1/8-inch aluminum angle, 39 inches long, frame end.
34	2	1-inch by 1-inch by 1/8-inch aluminum angle, 16 inches long, side frame members.
35	1	1-1/4-inch by 21-inch by .062-inch aluminum sheet, top.
36	1	1-1/2-inch by 1-1/2-inch by 1/8-inch by 14-3/8 inches long aluminum angle, light-mounting bracket.
36A	1	2-inch by 3/4-inch by 1/8-inch by 1-1/2 inches long aluminum angle, light bracket.
37	2	1/4-inch 28-thread bolts 3/4 inch long, for part No. 36.
38	2	1/4-inch 28-thread fiberlock wing nuts, for part No. 37.
39	1	1-inch by 1-inch by 1/8-inch by 1 inch long aluminum angle spacer for part No. 36.
40	1	3/8-inch by 1-3/4-inch diameter sheet aluminum, disc lock.
41	1	1-1/2-inch diameter by 3-inch aluminum, shaft extension post.
42	1	7/8-inch diameter by 2-inch steel, extension post pin.
43	2	1/8-inch steel spring pins, 1-1/2 inches long.

Part Number	No.	Required	Material and Description
44	1		Nut, 5/8-inch, 18-thread, left-hand thread.
45	as req.		3/16-inch by 3/8 inch long, aluminum rivets.
46	1		3/8-inch pipe nipple 1-1/2 inches long.
47	1		3/8-inch 90° pipe ell.
48	1		3/8-inch pipe nipple, 4-1/2 inches long.
49	1		3/8-inch pipe coupling.
50	1		1/4-inch by 9-inch-diameter aluminum disc.
51	1 unit		2 each 1-inch by 2-inch by 10-foot pine 1 each 1-inch by 1-inch by 8-foot pine 1 each 1-inch by 10-inch by 10-foot pine 1 each 1-inch by 10-inch by 12-foot pine 1 each 1-inch by 3-inch by 12-foot pine 3/4-inch steel corrugated fasteners and nails as required.
52	1		Tool gauge board, pine, 1-inch by 10-inch by 19-1/2 inches long.
53	2		Axe guard, 1/8-inch steel, welded.
54	1		Pulaski guard, 1/8-inch steel, welded.
55	6		Wood screws for guards, 3/16-inch by 5/8-inch, flat-head.
56	2 pair		7-inch strap hasps, steel.
57	2		4-1/2-inch handles, steel, carrying.
58	24		Wood screws for hasp and handles, 3/16-inch by 3/4-inch, flat-head.
59	2		Bolts, grinder fasteners, 1/4-inch by 2-1/2-inch.
60	4		1/4-inch washers, steel, for part No. 59.
61	2		1/4-inch fiberlock wing nuts, for part No. 59.
62	2		3-inch snaps.
63	2		Chain, single jack, 8-inches long, 30-pound break strength.
64	1		1-gallon gasoline can. 1 5-inch funnel.
	1		5/16-inch by 8-inch screw driver
	1		Socket wrench, 31/32-inch, 3 inches long, sparkplug type.
	1		Socket bar, 5/16-inch by 6-inch steel.
	1		6-inch crescent wrench.
	1		Pair regular pliers.
	1		Pair goggles.

